REMARKS

Claims 1-24 are currently pending in the above-identified patent application. In the subject Office Action, claims 1-4, 6-12, 14-20, and 22-24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rezaul Islam et al. (U.S. Patent No. 6,282,670) in view of Burns et al. (U.S. Patent No. 6,088,694), since the Examiner stated that as per claim 1, Rezaul Islam et al. discloses a method for recovering data in a redundant data storage system having a plurality of data storage units, said method comprising: storing said data on said plurality of data storage units according to a redundant data storage method; removing one of said plurality of data storage units; while said one of said plurality of data storage units is removed, changing a portion of said data on the remainder of said plurality of data storage units; replacing said one of said plurality of data storage units; and updating said one of said plurality of data storage units. The Examiner continued that Rezaul Islam et al. does not specifically teach storing a record of said changes in a delta file and updating those portions of data recorded in said delta file as required by the claim, but that Burns et al. discloses storing a record of changes in a delta file and updating portions of data recorded in the delta file in order to achieve efficient and cost effective backup of data. The Examiner then concluded that since the technology for implementing a storage recovery system with storing a record of changes in a delta file and updating portions of data recorded in the delta file is well known as evidenced by Burns et al., an artisan would have been motivated to implement this feature in the system of Rezaul Islam et al. in order to achieve efficient and cost effective backup of data, and therefore, it would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the system of Rezaul Islam et al. to include storing a record of changes in a delta file and updating portions of data recorded in the delta file because this would have achieved efficient and cost effective backup of data as taught by Burns et al.

As per claims 9 and 17, the Examiner incorporated the rationale in the rejection of claim 1. The Examiner continued that Rezaul Islam et al. further discloses a redundant data storage system capable of fast restoration of serviced data storage units comprising: a plurality of data storage units; and a controller that

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stores data on said plurality of data storage units according to a redundant data storage method, changes a portion of said data after taking one of said plurality of said data storage units off line, stores a record of the changes in a delta log that are made to the remainder of the plurality of said data storage units, brings said one of said plurality of said data storage units online, and updates said one of said plurality of said data storage units by updating those portions of data recorded in said delta file.

Applicants respectfully disagree with the Examiner's rejection of independent claims 1, 9 and 17 for the reasons to be set forth hereinbelow.

The Examiner also rejected dependent claims 2 - 4, 6 - 8, 10 - 12, 14 - 16, 18 - 20, and 22 – 24 under 35 U.S.C. 103(a) as being unpatentable over Rezaul et al. in view of Burns et al. Since these claims depend from independent claims 1, 9 and 17, and applicants believe that these claims are patentable over Rezaul Islam et al. in combination with Burns et al. for the reasons to be set forth hereinbelow, applicants believe further that the dependent claims are patentable.

Claims 5, 13, and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rezaul Islam et al. in view of Burns et al. as applied to claims 1, 9, and 17 respectively, and further in view of McCabe et al. (U.S. Patent Application Publication No. 2002/0016827). Since, as will be set forth hereinbelow, applicants believe that the Examiner has improperly combined Rezaul Islam et al. with Burns et al., applicants respectfully believe that the Examiner has improperly rejected claims 5, 13, and 21 under 35 U.S.C. 103(a) by further combining these references with McCabe et al.

The Examiner made Lu (U.S. Patent No. 6,952,794) and Gold et al. (U.S. Patent No. 6,785,786) of record as pertinent to applicants' disclosure, but did not apply these references to the subject claims. As a result, applicants believe that no further response is required.

Turning to pages 4 - 6 and FIG. 1 of the subject Specification, as originally filed, a mirrored data storage system is shown to illustrate an embodiment of the present invention. Controller **102** controls data storage units **104** and **106**. Delta log **108** may be used when one of the data storage units **104** or **106** is taken offline,

or otherwise becomes unavailable, to keep track of any changes made to the data during the temporary outage of one of the data storage units. When the data storage unit again becomes available, the changed data as recorded in the delta log may be updated in the restarted data storage unit. Delta log 108 may be configured in a number of different ways: for example, it may comprise pointers to the starting and stopping addresses of any changed data; or it may include the read and write requests in their entirety.

When one of data storage units 104 or 106 is replaced with a new data storage unit, the controller 102 may rebuild the replaced drive by copying all of the information from the known good data storage unit to the replaced one. Such copying can be very time consuming when the data storage units are very large, but necessary when the replaced data storage unit contains no data. Such processes may cause the overall response time of the system to suffer during the period of rebuilding the new data storage unit. When data storage device 104 or 106 is taken off line without losing any data, it may be brought back online and the delta log 108 may indicate those data that need updating. In this manner, the data storage unit may be quickly updated and returned to service without a lengthy rebuild process.

Independent claims 1, 9 and 17 recite the feature that the delta log is started when one of the storage units is taken off line.

The lines quoted by the Examiner as describing the teachings of Rezaul Islam et al. (Col. 4, lines 33-42) state: "Briefly, the invention relates to managing defective media in a RAID system having redundancy for use with removable and identifiable storage devices that can be attached to the RAID system at a plurality of different points. The system has means for identifying a failed storage device and removing the failed storage device from the RAID system, and means for reconstructing data stored on the failed storage device, for recording on a replacement device; from data and redundant data stored on remaining ones of the identifiable storage devices." In lines 42-57 or Rezaul Islam et al., it is stated: "The system detects storage areas of the remaining ones of the identifiable storage devices that contain media defects, and records in non-volatile storage, identification of areas of the identifiable storage devices that contain media defects.

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The system continues reconstructing the data stored on the failed storage device, for recording on the replacement device, from data and redundant data stored on remaining ones of the identifiable storage devices. The RAID system of the invention records the identification of areas of the identifiable storage devices that contain media defects in a non-volatile random access memory on an adapter circuit card of the RAID system. In this way, although a logical stripe of data is lost, other data on the logical device continues to be reconstructed and the user need not replace lost data on an entire logical device."

By contrast, Col. 5, lines 25-40 of Burns et al. states: "The invention can be applied to the operation of updating a linked file A1, which was described above. In accordance with the invention, the procedure could be changed as follows: (a) make a copy of file A1 using the filesystem services. Let the copy of the file be called A2. (b) Modify A2. Note that file A1 remains linked while the user modifies A2 and is available for the DBMS queries. (c) Make a new metadata based on the content of A2. (d) Update the row which referenced file A1 in the database with the metadata and reference A2. The update processing in the DBMS involves the following. File A1 is 'unlinked' and A2 is 'linked' as part of the same transaction." Additionally, in Col. 5, line 61 to Col. 6, line 5 of Burns et al., as identified by the Examiner, it is stated: "The efficient backup involves that only the modified portions of a 'versioned' file be backed up. In our example above, the reference file A1 is referred to as a 'versioned' file. Assume file A1 is backed up in total. However, the backup operation of the new version of file A2 would involve backing up only the modified portions with respect to A1. The file changes from a prior version define what is called a delta file. This delta file compactly represents A2 as a set of changes with respect to A1. By backing up this delta file instead of backing up the whole file A2, a computer system may reduce the cost of backup for frequently versioned data and files."

Clearly, the Burns et al. reference teaches away from the Rezaul Islam et al. reference in that Burns et al. requires that A1 remain linked while the user modifies A2, A1 being available for the DBMS queries. Rezaul Islam et al., by contrast, requires that the system has means for identifying a failed storage device and for

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removing the failed storage device from the RAID system. As stated hereinabove, subject independent claims 1, 9 and 17 also require this feature. Applicants therefore respectfully believe that the Examiner has failed to make a proper *prima facie* argument for obviousness as is required in a rejection under 35 U.S.C. 103(a).

Additionally, Burns et al. teaches backing up the delta file instead of backing up the entire file A2, while the system of Rezaul Islam et al. has means for reconstructing data stored on the failed storage device, for recording on a replacement device, from data and redundant data stored on remaining ones of the identifiable storage devices. Again, Burns et al. teaches away from Rezaul Islam et al., leading to the conclusion that the Examiner has improperly combined Burns et al. with Rezaul et al.

Further, Burns et al. teaches away from the present claimed invention, for example, by not requiring that the failed storage unit be removed from the system and, as stated by the Examiner, Rezaul Islam et al. does not teach storing a record of said changes in a delta file and updating those portions of data recorded in said delta file as required by the subject claims.

In view of the discussion presented hereinabove, applicants believe that subject claims 1-24 are in condition for allowance, and such action by the Examiner at an early date is earnestly solicited.
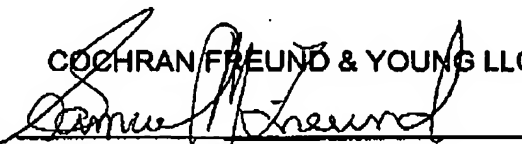
Reexamination and reconsideration are respectfully requested.

Respectfully submitted,

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